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A new halotolerant species of *Alternaria* from Qinghai-Tibet Plateau, China

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ABSTRACT — A new halotolerant species of *Alternaria*, *A. xiaochaidanensis*, is described and illustrated. The specimen was collected from a salt lake on Qinghai-Tibet Plateau. The type specimen is deposited in the Herbarium of the Department of Plant Pathology, Shandong Agricultural University (HSAUP).

KEY WORDS — taxonomy, saline, extremophiles

Introduction

Salt tolerant fungi have evolved special physiological mechanisms and metabolic products to survive in the extreme environment of salt-water lakes. In recent decades, more attention has been paid to salt tolerant fungi – both halotolerant and halophilic fungi. Cronin & Post (1977) described the first halophilic filamentous fungus, *Cladosporium* sp., from a hypersaline lake in the Great Salt Lake, USA. To date, more than 80 halotolerant fungal species and six halophilic fungi have been reported (Gunde-Cimerman et al. 2005, 2009).

Qinghai-Tibet Plateau region has the world's highest altitude salt lake. It is a potentially huge treasure trove of genetic resources with its diversity of water chemistry characteristics and different biotic and abiotic anti-positive gene. Thus, it is important to study microorganisms of Qinghai-Tibet Plateau, especially halophilic and halotolerant microorganisms. Here, we describe a new species of *Alternaria* that was isolated from Xiaochaidan, a salt lake on Qinghai-Tibet Plateau. This is the first report of a halotolerant *Alternaria* species.

Alternaria xiaochaidanensis F. Wang, A.N. Li, D.M. Dai, X.X. Xu & D.C. Li **sp. nov.**

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FIG. 1

Differs from *Alternaria chlamydospora* and *A. mouchaccae* by its larger usually beaked conidia and its different conidial shape.

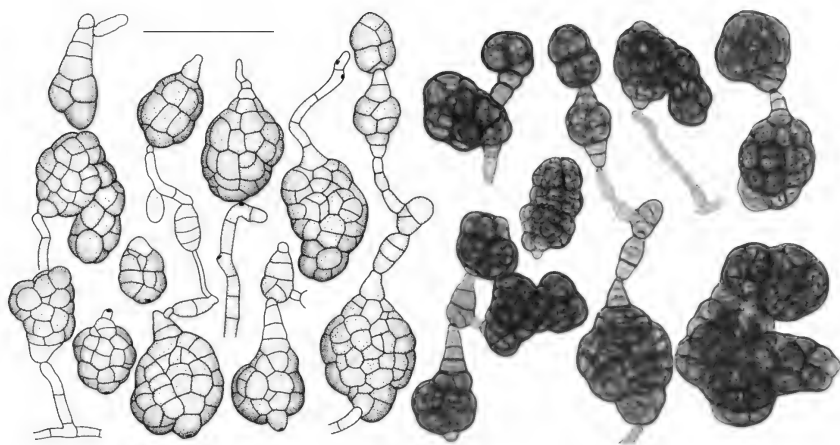


FIG. 1. *Alternaria xiaochaidanensis* (ex holotype).

Conidia, conidiophores and conidiogenous cells. Left: drawings. Right: photomicrographs.
(Bar = 50 μ m).

TYPE: China, Qinghai, Xiaochaidan, from a lake soil, altitude 2800–2840 m, July 2011,
F. Wang (Holotype, HSAUP II 011501; GenBank, JX235958).

ETYMOLOGY: in reference to the type locality.

Alternaria xiaochaidanensis grows rapidly, colonies on potato carrot agar at 28°C reach 6.5–7.5 cm diam. in 7 days, effuse, circular, pale brown; reverse fuscous-black. Mycelium superficial or immersed; hyphae hyaline, grey-white. Conidiophores either solitary, not branched, 28–54 (–68) $\times$ 3–5 μ m, or arising as lateral branches from superficial hyphae and up to 170 μ m long. Conidia produced from conidiophores or directly from hyphae, solitary or in short chains of 2–5, rostrate or non-rostrate, 13–74 $\times$ 6–61 μ m. Juvenile conidia ovoid or obclavate, pale brown; mature conidia symmetrical or asymmetrical, irregular in shape and size, brown, smooth, walls thickened, with transverse, longitudinal and oblique septa, often constricted at septa.

COMMENTS –This species may be confused with *A. mouchaccae* (Simmons 1981) and *A. chlamydospora* (Mouchacca 1973). However, conidia of those species are smaller: *A. mouchaccae* (25–40(–50) $\times$ 12–20(–22) μ m) and *A. chlamydospora* (26–70 $\times$ 8–48 μ m). Although sometimes found in chains of 2–5, conidia in *A. xiaochaidanensis* are usually single; in *A. chlamydospora* conidia are often in chains of 5–8 while conidia of *A. mouchaccae* are rarely in chains. In contrast to *A. xiaochaidanensis*, conidia of *A. mouchaccae* and *A. chlamydospora* have no beak. A conspicuous characteristic of the new species is that mature conidia are symmetrical or asymmetrical and have specific shapes that obviously differ from those of *A. chlamydospora*. Conidiophores of

A. xiaochaidanensis are longer than those of *A. chlamydospora* (15–18 × 3 µm, up to 150 µm) and shorter than those of *A. mouchacca* (40–50 × 3–4 µm).

A BLAST search comparison of its sequence in GenBank places *A. xiaochaidanensis* into *Alternaria* but with no previously described species close to it.

Gunde-Cimerman et al. (2005, 2009) characterized fungi that can grow in vitro at 3 M salt concentration and are regularly isolated from global environments at salinities above 1.7 M as halophilic, whereas isolates that can grow in vitro sporadically at 3 M NaCl are considered halotolerant. Species isolated above 1.7 M NaCl grow regularly on PDA but slowly at 3 M. According to this definition, the authors consider *Alternaria xiaochaidanensis* a halotolerant fungus.

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